National Center for Education Statistics
U.S Department of Education
1990 K St., NW
Washington, D.C. 20006

Identification Label

Teacher Name: _____

Class Name: _____

Teacher ID: _____ Teacher Link # _____

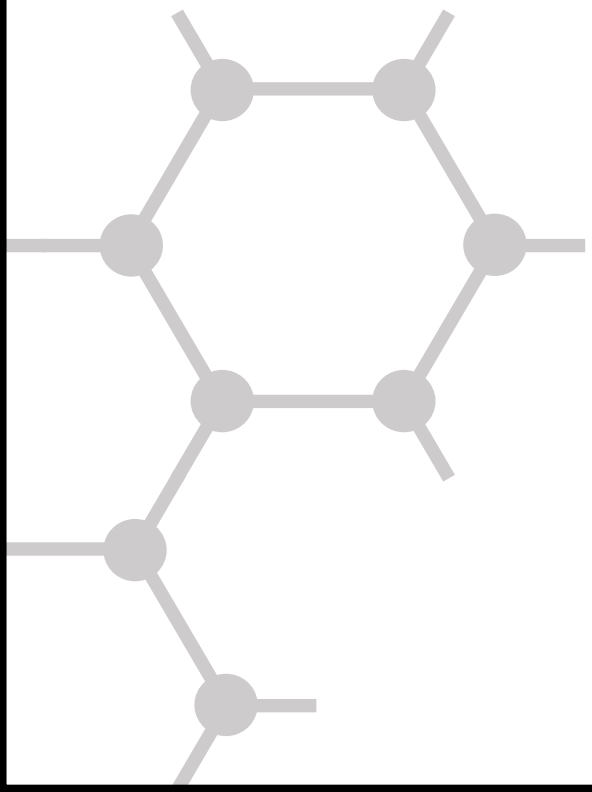
IEA Trends in International Mathematics and Science Study

TIMSS 2003

Main Survey

Teacher Questionnaire

Science
Grade 8



General Directions

Your school has agreed to participate in TIMSS 2003, a large international study of student learning in mathematics and science in more than 50 countries around the world. Sponsored by the International Association for the Evaluation of Educational Achievement (IEA), TIMSS (for Trends in International Mathematics and Science Study) is measuring trends in student achievement and studying differences in national education systems in order to help improve the teaching and learning of mathematics and science worldwide.

As part of the study, students in a nationwide sample of eighth-grade classes in the United States will complete the TIMSS mathematics and science tests. This questionnaire is addressed to teachers who teach science to these students, and seeks information about teachers' academic and professional background, instructional practices, and attitudes toward teaching science. As a teacher of science to students in one of these sampled classes, your responses to these questions are very important in helping to describe science education in the United States.

Some of the questions in this questionnaire ask about a particular science class that you teach. This is the class which is identified on the cover of this questionnaire, and which includes students who will be tested as part of TIMSS 2003 in your school.

Please identify a time and place where you will be able to complete this questionnaire without being interrupted. Filling out the questionnaire should require no more than 45 minutes. To make it as easy as possible for you to respond, most questions may be answered simply by checking or filling the appropriate circle.

Once you have completed the questionnaire, place it in the return envelope provided and return it to the school coordinator.

Thank you very much for the time and effort you have put into responding to this questionnaire.

Background Information

1

How old are you?

*Fill in **one** circle only*

- Under 25 ○
- 25–29 ○
- 30–39 ○
- 40–49 ○
- 50–59 ○
- 60 or older ○

2

Are you female or male?

*Fill in **one** circle only*

- Female ○
- Male ○

3

By the end of this school year, how many years will you have been teaching altogether? Do not include teaching as a substitute or student teacher.

_____

*Number of **years** you have taught full time*

_____

*Number of **years** you have taught part time*

Preparation to Teach

4

What is the highest level of formal education you have completed?

*Fill in **one** circle only*

- Did not complete high school ○
- Finished high school ○
- Some vocational/technical education after high school ○
- Some community college, college, or university courses ○
- Completed a bachelor's degree at a college or university ○
- Finished master's degree or higher ○

5

How many years of preservice teacher training did you have (e.g., time spent in a teacher education program such as student teaching or a mentorship)? Please round to the nearest whole number.

*Fill in **one** circle only*

- 0 years ○
- 1 year ○
- 2 years ○
- 3 years ○
- 4 years ○
- 5 years ○
- More than 5 years ○

6

During your college or university education, what was your main area(s) of study?

*Fill in **one** circle for each row*

		Major	Minor	No
a)	Biology	○	○	○
b)	Physics	○	○	○
c)	Chemistry	○	○	○
d)	Earth Science	○	○	○
e)	Education - Science	○	○	○
f)	Mathematics	○	○	○
g)	Education - Mathematics	○	○	○
h)	Education - Other	○	○	○
i)	Other	○	○	○

7

What requirements did you have to satisfy in order to become a science teacher in grade 8?

*Fill in **one** circle for each row*

		Yes	No
a)	Complete a bachelor's degree	○	○
b)	Complete a probationary period	○	○
c)	Complete a minimum number of education courses	○	○
d)	Complete a minimum number of science courses	○	○
e)	Pass a licensing examination	○	○

8

A. Do you have a teaching license or certificate?

	Yes	No
*Fill in **one** circle only*	○	○

*If **No**, please go to question **9** on next page* ➡

B. What type of license or certificate do you hold?

*Fill in **one** circle only*

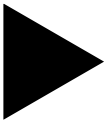
- Regular or standard state certificate or advanced professional certificate ○
- Probationary certificate (the initial certificate issued after satisfying all requirements except the completion of a probationary period) ○
- Provisional or other type given to persons who are still participating in what the state calls an "alternative certification program" ○
- Temporary certificate (requires some additional college coursework and /or student teaching before regular certification can be obtained) ○
- Emergency certificate or waiver (issued to persons with insufficient teacher preparation who must complete a regular certification program in order to continue teaching) ○

9

Considering your training and experience in both science content and instruction, how ready do you feel you are to teach these topics in the eighth grade?

*Fill in **one** circle for each row*

	Very ready	Ready	Not ready
A. Biology			
a) Major organs and organ systems in humans and other organisms (structure/function, life processes that maintain stable bodily conditions)	○	○	○
b) Cells and their functions, including respiration and photosynthesis as cellular processes	○	○	○
c) Reproduction (sexual and asexual) and heredity (passing on of traits, inherited versus acquired/learned characteristics)	○	○	○
d) Role of variation and adaptation in survival/extinction of species in a changing environment	○	○	○
e) Interaction of living organisms and the physical environment in an ecosystem (energy flow, food webs, effect of changes, cycling of materials)	○	○	○
B. Chemistry			
a) Classification and composition of matter (characteristics of elements, compounds, mixtures)	○	○	○
b) Particulate structure of matter (molecules, atoms, protons, neutrons, and electrons)	○	○	○
c) Properties of solutions (solvent, solute, concentration/dilution, effect of temperature on solubility)	○	○	○
d) Properties and uses of common acids and bases	○	○	○
e) Chemical change (transformation of reactants, evidence of chemical change, conservation of matter, common oxidation reactions - combustion and rusting)	○	○	○
C. Physics			
a) Physical states and changes in matter (explanations of properties in terms of movement/distance between particles; phase change by supplying/removing heat/energy, thermal expansion and changes in volume and/or pressure)	○	○	○
b) Energy types, sources, and conversions, including heat transfer	○	○	○
c) Basic properties/behaviors of light (reflection, refraction, light and color, simple ray diagrams) and sound (production by vibration, transmission through media, relative speed of light and sound)	○	○	○
d) Electric circuits (flow of current; types of circuits - opened/closed and parallel/series; current/voltage relationship)	○	○	○
e) Forces and motion (types of forces, basic description of motion, use of distance/time graphs, effects of density and pressure	○	○	○



9 continued

Considering your training and experience in both science content and instruction, how ready do you feel you are to teach these topics in the eighth grade?

*Fill in **one** circle for each row*

	Very ready	Ready	Not ready
D. Earth Science			
a) Earth's structure and physical features (earth's crust, mantle and core; use of topographic maps)	○	○	○
b) Earth's processes, cycles and history (rock cycle; water cycle; weather patterns; major geological events; formation of fossils and fossil fuels)	○	○	○
c) Earth in the solar system and the universe (phenomena on earth - day/night, tides, phases of moon, eclipses, seasons; physical features of earth compared to other bodies; the sun as a star)	○	○	○
E. Environmental Science			
a) Trends in human population and its effects on the environment	○	○	○
b) Use and conservation of earth's natural resources (renewable/nonrenewable resources, human use of land/soil and water resources)	○	○	○
c) Changes in environments (role of human activity, global environmental concerns, impact of natural hazards)	○	○	○

Teaching Time

10

A. In one typical calendar week from Monday to Sunday, what is the total number of single periods for which you are formally scheduled? Count a double period as two periods.

_____

Write in the number of periods

B. Of these formally scheduled periods, for how many are you assigned to do each of the following?

Write in the number of periods

a) Teach general science ---------- _____

b) Teach physical science ---------- _____

c) Teach physics ---------- _____

d) Teach chemistry ---------- _____

e) Teach life science/biology ---------- _____

f) Teach Earth science ---------- _____

g) Teach mathematics ---------- _____

h) Teach other subjects ---------- _____

i) Perform other duties ---------- _____

Total ---------- _____

Should match number in 10A

C. How many minutes are in a typical single period?

_____

Write in the number of minutes

11

Outside the formal school day, approximately how many hours per week do you normally spend on each of these activities? Do not include the time already accounted for in Question 10. Please round to the nearest whole number.

Write in the number of hours per week

a) Grading student tests, exams, or other student work ---------- _____

b) Planning lessons ---------- _____

c) Administrative and recordkeeping tasks including staff meetings ----- _____

d) Other ---------- _____

Professional Development

12

How often do you have the following types of interactions with other teachers?

*Fill in **one** circle for each row*

	Daily or almost daily	1-3 times per week	2 or 3 times per month	Never or almost never
a) Discussions about how to teach a particular concept	○	○	○	○
b) Working on preparing instructional materials	○	○	○	○
c) Visits to another teacher's classroom to observe his/her teaching	○	○	○	○
d) Informal observations of **my** classroom by another teacher	○	○	○	○

13

In the past two years, have you participated in professional development in any of the following?

*Fill in **one** circle for each row*

	No	Yes
a) Science content	○	○
b) Science pedagogy/instruction	○	○
c) Science curriculum	○	○
d) Integrating information technology into science	○	○
e) Improving students' critical thinking or inquiry skills	○	○
f) Science assessment	○	○

Attitudes Toward Science

14

To what extent do you agree or disagree with each of the following statements?

*Fill in **one** circle for each row*

	Disagree a lot	Disagree	Agree	Agree a lot
a) More than one representation (picture, concrete material, symbols, etc.) should be used in teaching a science topic	○	○	○	○
b) Solving science problems often involves hypothesizing, estimating, testing, and modifying findings	○	○	○	○
c) Learning science mainly involves memorizing	○	○	○	○
d) There are many ways to conduct scientific investigation	○	○	○	○
e) Getting the correct answer is the most important outcome of a student's scientific experiment	○	○	○	○
f) Scientific theories are subject to change	○	○	○	○
g) Science is taught primarily to give students the skills and knowledge to explain natural phenomena	○	○	○	○
h) Modeling natural phenomena is essential to teaching science	○	○	○	○
i) Most scientific discoveries have no practical value	○	○	○	○

Your School

15

Thinking about your school, indicate the extent to which you agree or disagree with each of the following statements about your school.

*Fill in **one** circle for each row*

	Agree a lot	Agree	Disagree	Disagree a lot
a) This school facility (building and grounds) is in need of significant repair	○	○	○	○
b) This school is located in a safe neighborhood	○	○	○	○
c) I feel safe at this school	○	○	○	○
d) This school's security policies and practices are sufficient	○	○	○	○

16

How would you characterize each of the following within your school?

*Fill in **one** circle for each row*

	Very high	High	Medium	Low	Very low
a) Teachers' job satisfaction	○	○	○	○	○
b) Teachers' understanding of the school's curricular goals	○	○	○	○	○
c) Teachers' degree of success in implementing the school's curriculum	○	○	○	○	○
d) Teachers' expectations for student achievement	○	○	○	○	○
e) Parental support for student achievement	○	○	○	○	○
f) Parental involvement in school activities	○	○	○	○	○
g) Students' regard for school property	○	○	○	○	○
h) Students' desire to do well in school	○	○	○	○	○

The TIMSS Class

In this section, many of the questions refer to a **particular science class that you teach.** Please remember that this is the class which is identified on the cover of this questionnaire.

17

How many students are in the class with the TIMSS students?

_____

Write in the number of students

18

How many minutes per week do you teach science to the class with the TIMSS students?

_____

Write in the number of minutes per week

19

A. Do you use a textbook(s) in teaching science to the class with the TIMSS students?

	No	Yes
*Fill in **one** circle only*	○	○

*If **No**, please go to question* **20**

B. How do you use a textbook(s) in teaching science to the class with the TIMSS students?

*Fill in **one** circle only*

As the primary basis for my lessons ○

As a supplementary resource ○

20

In a typical week of science lessons for the class with the TIMSS students, what percentage of time do students spend on each of the following activities?

Write in the percent
The total should add to 100%

a) Reviewing homework _____%

b) Listening to lecture-style presentations _____%

c) Working problems with your guidance _____%

d) Working problems on their own without your guidance _____%

e) Listening to you re-teach and clarify content/procedures _____%

f) Taking tests or quizzes _____%

g) Participating in classroom management tasks not related to the lesson's content/purpose (e.g., interruptions and keeping order) _____%

h) Other student activities _____%

Total 100%

Teaching Science to the TIMSS Class

21

In teaching science to the students in the class with the TIMSS students, how often do you usually ask them to do the following?

*Fill in **one** circle for each row*

	Never	Some lessons	About half the lessons	Every or almost every lesson
a) Watch me demonstrate an experiment or investigation	○	○	○	○
b) Formulate hypotheses or predictions to be tested	○	○	○	○
c) Design or plan experiments or investigations	○	○	○	○
d) Conduct experiments or investigations	○	○	○	○
e) Work together in small groups on experiments or investigations	○	○	○	○
f) Write explanations about what was observed and why it happened	○	○	○	○
g) Put events or objects in order and give a reason for the organization	○	○	○	○
h) Study the impact of technology on society	○	○	○	○
i) Learn about the nature of science and inquiry	○	○	○	○
j) Relate what they are learning in science to their daily lives	○	○	○	○
k) Present their work to the class	○	○	○	○

22

In your view, to what extent do the following limit how you teach the class with the TIMSS students?

*Fill in **one** circle for each row*

	A lot	Some	A little	Not at all	Not applicable
Students					
a) Students with different academic abilities	○	○	○	○	○
b) Students who come from a wide range of backgrounds (e.g., economic, language)	○	○	○	○	○
c) Students with special needs (e.g., hearing, vision, speech impairment, physical disabilities, mental or emotional/psychological impairment)	○	○	○	○	○
d) Uninterested students	○	○	○	○	○
e) Low morale among students	○	○	○	○	○
f) Disruptive students	○	○	○	○	○
Resources					
g) Shortage of computer hardware	○	○	○	○	○
h) Shortage of computer software	○	○	○	○	○
i) Shortage of support for using computers	○	○	○	○	○
j) Shortage of textbooks for student use	○	○	○	○	○
k) Shortage of other instructional equipment for students' use	○	○	○	○	○
l) Shortage of equipment for your use in demonstrations and other exercises	○	○	○	○	○
m) Inadequate physical facilities	○	○	○	○	○
n) High student/teacher ratio	○	○	○	○	○

23

By the end of this school year, approximately what percentage of teaching time will you have spent during this school year on each of the following science content areas for the class with the TIMSS students?

Write in the percent
The total should add to 100%

a) Life science (e.g., types, characteristics, and classification of living things; structure/function and life processes in organisms; cells and their functions; development, reproduction, and heredity; diversity, adaptation, and natural selection; ecosystems; and human health) ---------- _____%

b) Chemistry (e.g., classification, composition and particulate structure of matter; properties and uses of water; acids and bases; and chemical change) ----------_____%

c) Physics (e.g., physical states and changes in matter; energy types, sources, and conversions; heat and temperature; light; sound and vibration; electricity and magnetism; forces and motion) --------_____%

d) Earth science (e.g., earth's structure and physical features; earth's processes, cycles and history; the solar system and universe) ---------_____%

e) Environmental science (e.g., changes in population; use and conservation of natural resources; and changes in environments) ----------_____%

f) Other, please specify:

_____ -------_____%

Total ---------- 100%

24

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the class with the TIMSS students have been taught each topic. If a topic was taught half this year and half before this year, please choose "Mostly taught this year."

*Fill in **one** circle for each row*

	Not yet taught or just introduced	Mostly taught this year	Mostly taught before this year
A. Biology			
a) Classification of organisms on the basis of a variety of physical and behavioral characteristics	○	○	○
b) The major organ systems in humans and other organisms	○	○	○
c) How the systems function to maintain stable bodily conditions	○	○	○
d) Cell structures and functions	○	○	○
e) Photosynthesis and respiration as processes of cells and organisms, including substances used and produced	○	○	○
f) Life cycles of organisms, including humans, plants, birds, insects	○	○	○
g) Reproduction (sexual and asexual) and heredity (passing on of traits), versus inherited acquired/learned characteristics	○	○	○
h) The role of variation and adaptation in survival/extinction of species in a changing environment	○	○	○
i) The interaction of living organisms in an ecosystem (energy flow, food chains and food webs, food pyramids, and the effects of change upon the system)	○	○	○
j) Cycling of materials in nature (water, carbon/oxygen cycle, decomposition of organisms)	○	○	○
k) Causes of common infectious diseases, methods of infection/transmission, prevention, and the body's natural resistance and healing capabilities	○	○	○
l) Preventive medicine methods (diet, hygiene, exercise and lifestyle)	○	○	○

24 continued

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the class with the TIMSS students have been taught each topic. If a topic was taught half this year and half before this year, please choose "Mostly taught this year."

*Fill in **one** circle for each row*

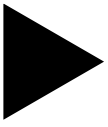
	Not yet taught or just introduced	Mostly taught this year	Mostly taught before this year
B. Chemistry			
a) Classification and composition of matter (physical and chemical characteristics, pure substances and mixtures, separation techniques)	○	○	○
b) Properties of solutions (solvents, solutes, effects of temperature on solubility)	○	○	○
c) Particulate structure of matter (molecules, atoms, protons, neutrons, and electrons)	○	○	○
d) Properties and uses of water (composition, melting/boiling points, changes in density/volume)	○	○	○
e) The properties and uses of common acids and bases	○	○	○
f) Chemical change (transformation of reactants, evidence of chemical change, conservation of matter)	○	○	○
g) The need for oxygen in common oxidation reactions (combustion, rusting) and the relative tendency of familiar substances to undergo these reactions	○	○	○
h) Classification of familiar chemical transformations as releasing or absorbing heat/energy	○	○	○

24 continued

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the class with the TIMSS students have been taught each topic. If a topic was taught half this year and half before this year, please choose "Mostly taught this year."

*Fill in **one** circle for each row*

	Not yet taught or just introduced	Mostly taught this year	Mostly taught before this year
C. Physics			
a) Physical states and changes in matter (explanations of properties including volume, shape, density and compressibility in terms of movement/distance between particles)	○	○	○
b) The processes of melting, freezing, evaporation, and condensation (phase change by supplying/removing heat; melting/boiling points; effects of pressure and purity of substances)	○	○	○
c) Energy types, sources, and conversions, including heat transfer	○	○	○
d) Thermal expansion and changes in volume and/or pressure	○	○	○
e) Basic properties/behavior of light (reflection, refraction, light and color, simple ray diagrams)	○	○	○
f) Properties of sound (production by vibration, transmission through media, ways of describing sound (intensity, pitch), relative speed)	○	○	○
g) Electric circuits (flow of current, types of circuits – open/closed, parallel/series) and relationship between voltage and current	○	○	○
h) Properties of permanent magnets and electromagnets	○	○	○
i) Forces and motion (types of forces, basic description of motion), use of distance/time graphs	○	○	○
j) Effects of density and pressure	○	○	○



24 continued

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the class with the TIMSS students have been taught each topic. If a topic was taught half this year and half before this year, please choose "Mostly taught this year."

*Fill in **one** circle for each row*

	Not yet taught or just introduced	Mostly taught this year	Mostly taught before this year
D. Earth Science			
a) Earth's structure and physical features (earth's crust, mantle, and core; topographic maps)	○	○	○
b) The physical state, movement, composition, and relative distribution of water on the earth	○	○	○
c) The earth's atmosphere and the relative abundance of its main components	○	○	○
d) Earth's water cycle (steps, role of sun's energy, circulation/renewal of fresh water)	○	○	○
e) Processes in the rock cycle and the formation of igneous, metamorphic, and sedimentary rock	○	○	○
f) Weather data/maps, and changes in weather patterns (e.g., seasonal changes, effects of latitude, altitude and geography)	○	○	○
g) Geological processes occurring over billions of years (e.g., erosion, mountain building, plate movement)	○	○	○
h) Formation of fossils and fossil fuels	○	○	○
i) Explanation of phenomena on earth based on position/movement of bodies in the solar sytem and universe (e.g., day/night, tides, year, phases of the moon, eclipses, seasons, appearance of sun, moon, planets, and constellations)	○	○	○
j) The physical features of earth compared with the moon and other planets (e.g., atmosphere, temperature, water, distance from sun, period of revolution/rotation, ability to support life)	○	○	○
k) The sun as a star	○	○	○
E. Environmental Science			
a) Trends in human population and its effects on the environment	○	○	○
b) Use and conservation of natural resources (renewable/nonrenewable resources, human use of land/soil and water resources)	○	○	○
c) Changes in environments (role of human activity, effects/prevention of pollution, global environmental concerns, impact of natural hazards)	○	○	○

Computers in the TIMSS Class

25

A. Do students in the class with the TIMSS students have computers available to use during their science lessons? Do not include calculators.

	No	Yes
*Fill in **one** circle only*	○	○

*If **No**, please go to question **27** on next page* 

B. Do any of the computers have access to the Internet?

	No	Yes
*Fill in **one** circle only*	○	○

26

In teaching science to the class with the TIMSS students, how often do you have students use a computer for the following activities?

*Fill in **one** circle for each row*

	Never	Some lessons	About half the lessons	Every or almost every lesson
a) Do scientific procedures or experiments	○	○	○	○
b) Study natural phenomena through simulations	○	○	○	○
c) Practice skills and procedures	○	○	○	○
d) Look up ideas and information	○	○	○	○
e) Process and analyze data	○	○	○	○

Homework

27

Do you assign science homework to the class with the TIMSS students?

	No	Yes
*Fill in **one** circle only*	○	○

*If **No**, please go to question **32** on next page* 

28

How often do you usually assign science homework to the class with the TIMSS students?

*Fill in **one** circle only*

- Every or almost every lesson ○
- About half the lessons ○
- Some lessons ○

29

When you assign science homework to the class with the TIMSS students, about how many minutes do you usually assign? (Consider the time it takes an average student in your class to complete the assignment.)

*Fill in **one** circle only*

- Less than 15 minutes ○
- 15-30 minutes ○
- 31-60 minutes ○
- 61-90 minutes ○
- More than 90 minutes ○

30

How often do you assign the following kinds of science homework to the class with the TIMSS students?

*Fill in **one** circle for each row*

		Never or almost never	Sometimes	Always or almost always
a)	Doing problem/question sets	○	○	○
b)	Finding one or more applications of the content covered	○	○	○
c)	Reading from a textbook or supplementary materials	○	○	○
d)	Writing definitions or other short writing assignments	○	○	○
e)	Working on projects	○	○	○
f)	Working on small investigations or gathering data	○	○	○
g)	Preparing reports	○	○	○

31

How often do you do the following with the science homework assignments?

*Fill in **one** circle for each row*

		Never or almost never	Sometimes	Always or almost always
a)	Monitor whether or not the homework was completed	○	○	○
b)	Correct assignments and then give feedback to students	○	○	○
c)	Have students correct their own homework in class	○	○	○
d)	Use the homework as a basis for class discussion	○	○	○
e)	Use the homework to contribute towards students' grades or marks	○	○	○

32

How often do you give a science test or examination to the class with the TIMSS students? Do not include quizzes.

*Fill in **one** circle only*

- About once a week ○
- About every two weeks ○
- About once a month ○
- A few times a year ○
- Never ○

*If **Never**, you have completed the questionnaire* ●

33

What item formats do you typically use in your science tests or examinations? Do not include quizzes.

*Fill in **one** circle only*

- Only constructed-response ○
- Mostly constructed-response ○
- About half constructed-response and half objective (e.g., multiple-choice) ○
- Mostly objective ○
- Only objective ○

34

How often do you include the following types of questions in your science tests or examinations? Do not include quizzes

*Fill in **one** circle for each row*

		Never or almost never	Sometimes	Always or almost always
a)	Questions requiring understanding of concepts, relationships, and processes	○	○	○
b)	Questions involving hypotheses and conclusions	○	○	○
c)	Questions based on recall of facts or procedures	○	○	○

Thank You

for completing this questionnaire

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